

Remarks

Entry of this Amendment, reconsideration of the Application, and allowance of the claims are respectfully requested. Claims 51 and 58 are amended into independent form here. Therefore, claims 1, 3-6, 8-18, 21, 22, 24 and 41-64 are pending; including independent claims 1, 14, 18, 41, 51 and 58.

Allowable Subject Matter:

Applicant gratefully acknowledges the indication of allowance of claims 14-17, 57 and 64. Also, Applicant gratefully acknowledges the indication of allowability of claims 51-56 and 58-63. In response, claims 51 and 58 are both amended into independent form to include the features of their base claims 1 and 18 respectfully. An indication of full allowance of these claims is now respectfully requested.

Outstanding Rejections:

In the Office Action, the Specification was objected to as failing to describe the newly-entered drawing Figures 8-10. The above amendment to the Specification remedies this oversight with language taken almost verbatim from the issued U.S. Patent which was incorporated by reference. Removal of this objection is respectfully requested.

In the Office Action, claims 1, 3-6, 9, 10-13 and 18, 21, 22, 24, 49 and 50 remain rejected under 35 U.S.C. 103(a) as obvious over Wittry (U.S. Patent No. 5,892,809) in view of Ohsugi (U.S. Patent No. 5,249,216).

In its January 31, 2003 Response, Applicant traversed this rejection in detail – and the outstanding Office Action simply reiterated the prior rejection, without addressing Applicant's remarks. These remarks are reiterated below:

Applicant respectfully traverses this rejection on the following grounds: (1) The Office Action has misinterpreted the teachings of the base document Wittry thus voiding the underlying basis of this rejection; (2) the justification for combining the documents is deficient; (3) the documents themselves lack any teaching, suggestion or incentive for their combination; and (4)

the combination is a hindsight reconstruction of the claimed invention using Applicant's own disclosed subject matter.

Applicant also traverses the application of these documents against certain dependent claims, especially claims 6, 22, and 49-50.

First, the Office Action alleges that Wittry teaches a "total-reflection x-ray fluorescence system" at col. 5, lines 24-26. Applicant strenuously traverses this characterization of Wittry. As discussed in detail in Applicant's August 2002 Response, the expression "total-reflection x-ray fluorescence" (commonly abbreviated TXRF) is a term of the art. As described in Applicant's own Background of the Invention, TXRF is a specific analytical method in which x-rays are directed upon an optically reflective surface and are "totally" reflected with little or no surface scatter. TXRF is characterized by very low angles of incidence – usually referred to as grazing angles, of less than one (1) degree. TXRF is concerned with the claimed detection of foreign matter present on the surface.

A simple review of other TXRF documents and their drawings easily confirms this:

USP 5,742,658 to Tiffin (cited in a prior Office Action) col. 3 lines 13-30 (" ... a relatively new EDXRF **surface** analysis technique known as **total reflection x-ray fluorescence (TXRF)** ... an angle of incidence is very **small** ... typically less than .2 **degree** ...").

USP 5,249,216 to Ohsugi (cited originally by Applicant and also in the instant Office Action) col. 1 lines 8-10 ("... trace analysis of particles located near a surface such as **surface contaminations** by **total reflection x-ray fluorescence** ... **small** glancing angle ...") col. 4 line 41 ("....**06 degree** ...").

Applicant's independent claims 1 and 18 recite TXRF, which is concerned with the claimed detection of foreign matter present on the surface.

In contrast to this claimed invention, Wittry contains no teaching or suggestion of TXRF or surface analysis. Indeed, neither the cited pages of col. 3 nor the drawings disclose TXRF or the small glancing angles characteristic of TXRF. Certainly, the drawings all show much larger angles of incidence. Wittry is, in fact, not directed to this claimed TXRF apparatus, or the

claimed detection of “foreign matter on the surface.” Rather, Wittry is directed to standard, internal elemental analysis of the sample: col. 7, lines 12-20 (“... good coverage of elements in the periodic table ... enhances the detection of some of the **elements** of particular interest as dopants **in** semiconductor devices ...”).

Applicant respectfully submits that this misinterpretation of Wittry undercuts its viability as a primary reference, rendering the rejection improper on this basis alone.

Second, Applicant strenuously traverses the reasoning justifying the combination of Wittry and Ohsugi. The only justification given for the combination is the following language at page 3 of the Office Action:

It would have obvious ...[that] the surface of the sample of the total reflection x-ray fluorescence apparatus as disclosed by Wittry could be modified to incorporate a semiconductor wafer having an optical reflection surface as disclosed by Ohsugi. Accordingly the motivation is the resultant structure will be utilized in analyzing surface contamination on the surface of a semiconductor wafer, thereby, reducing the cost of manufacturing semiconductor wafers by testing a number of wafers to determine if any particles are located on the surfaces of the semiconductor wafers.

Noticeably absent from this justification is any express teaching, suggestion or incentive identified in the art for making the proposed combination. Just as in Winner International Royalty Corp. v. Wang, 48 U.S.P.Q. 2d 1139, 1144 (D.C. 1998), wherein the Court overturned a Board finding of obviousness, hindsight is always perfect and it is insufficient to prove at the time of the claimed invention, the separate elements of the device were present in the known art. “Rather, there must have been some explicit teaching or suggestion in the art to motivate one of even ordinary skill in the art to combine such elements so as to create the same invention.” Id. Winner’s cited authority, Arkie Loures Inc. v. Gene Larew Tackle Inc., 43 U.S.P.Q. 2d 1294, 1297 (Fed. Cir. 1997), similarly holds that:

It is insufficient to establish obviousness that the separate elements of the invention existed in the prior art, absent some teaching or suggestion, in the prior art, to combine the elements.

This justification does not identify a teaching, suggestion or incentive in the art to combine these references as required by cases like Winner and Arkie. This justification is simply a restatement of the results of the combination, rather than a reason for the combination drawn from the prior art or from the knowledge available to one of ordinary skill in the art.

Third, upon an independent review of these documents, there is no teaching, suggestion or incentive for their combination. In fact, as discussed above in detail, Wittry is not a TXRF reference at all. Since the Wittry document is not even in the TXRF field of the present invention or Ohsugi, one of ordinary skill would not find a suggestion for the combination proposed here. Other fundamental differences exist between these documents themselves, and the claimed invention.

For example, Ohsugi does not disclose any input beam focusing, as discussed at page 2 of the present Application – Ohsugi is in fact devoid of any discussion regarding the excitation beam profile. Therefore, Ohsugi does not and could not discuss any input focusing optics, especially of the type disclosed and claimed in the present Application.

Fourth, since this justification offers no technical basis outside that contained in Applicant's own specification, and merely restates the results of the combination in hindsight, this rejection also violates the well-known principle that an Applicant's own disclosure cannot be used as a reference against him.

The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that the claimed invention should be carried out and would have a reasonable likelihood of success, viewed in light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure. In re Dow Chemical Co. 5 U.S.P.Q. 2d 1529, 1531 (Fed. Cir. 1988) (multiple citations omitted). The combination simply restates the result of the combination, and is therefore using Applicant's disclosure, rather than an identified basis in the prior art, to combine the documents, in violation of this well known principle. This is yet another, independent reason why the current invention is not obvious.

In summary, Applicant traverses this rejection of independent claims 1 and 18, based on a misinterpretation of the base reference Wittry; the conclusory nature of the reason for combination; the lack of an actual teaching, suggestion or incentive in the art for the combination; and the use of Applicant's own disclosure and results as a basis for the combination.

The dependent claims are patentable for the same reasons discussed above, as well as for their own additional features.

For example, claim 6 and amended claim 22 both recite one or more apertures for limiting the convergent angle of the diffracted x-rays. Since the x-ray optic produces the diffracted x-rays, these claims necessarily require that the aperture is placed after the x-ray optic. Dependent claims 49 and 50 both positively recite placement after the optic. These features are shown clearly in Applicant's Figure 1. As discussed at page 9 of the Application: "The aperture produces a convergent angle in the dispersion plane for the diffracted x-rays which is less than the critical angle of incidence for the surface to ensure the total reflection of the x-rays from the optical reflection surface for the wavelength of the x-rays." This type of aperture is, therefore, important for limiting the angle of incidence required in Applicant's claimed TXRF system.

To remove any ambiguity regarding placement of the aperture, claims 7 and 23 (which recite placement before the optic) have been canceled; and claims 6 and 22 have been amended to recite that the angle onto the surface is limited by the claimed apertures.

Applicant strenuously traverses the Office Action's interpretation of Wittry and Uhsugh against the remaining claims:

Wittry's "apertures": Page 3 of the Office Action applies element "27" and column 6 of Wittry. However, these apertures are not the same as those claimed by Applicant. Wittry's aperture 27 is for the electron beams, not x-rays, in Wittry's source. His apertures exist in the electron beam column, before the x-rays are even produced by Wittry's target assembly 31, and certainly not after Wittry's diffractors 8-12. Wittry's apertures therefore have no impact on the diffracted x-ray incident angle, as claimed. Moreover, shield 73 of Wittry does not limit the convergent angle, but is simply a protective shield against x-ray scattering. Wittry's standard XRF teachings (discussed in detail above) in fact teach away from limiting a convergent angle since standard XRF is not concerned with limiting incident angles, as is the claimed TXRF.

Ohsugi's "apertures": Page 4 of the Office Action applies Ohsugi's "slit" 5 and column 8 lines 18-21. This slit is, however, part of the detection system after the sample, and therefore does not limit the convergent angle of the diffracted x-rays produced by the x-ray optic as claimed. Moreover, Ohsugi's slit 2 is placed before the x-ray optic, not after the x-ray optic, as claimed.

In combination with Applicant's doubly-curved optic of the independent claims, the apertures of these dependent claims further limit the incident angle onto the surface, which is critical in TXRF systems. Since neither Wittry nor Ohsugi teach an aperture following a doubly-curved optic, Applicant respectfully submits that claims 6 and 22, along with their further limiting claims 49 and 50 are patentable. In fact, these claims are patentable even assuming, arguendo, that the combination proposed by the Examiner is proper, because of the complete absence of any teaching or suggestion of these claims in either document.

Withdrawal of this obviousness rejection is therefore respectfully requested.

In the Office Action, claims 51 and 58 were rejected on obviousness-type double patenting grounds. However, in the body of this rejection, the Office Action appears to indicate that the claims would be allowable if combined with the features of independent claims 1 and 18. As discussed above, claims 51 and 51 are indeed amended herein to include the features of claims 1 and 18, respectively. Withdrawal of this rejection (or clarification) is respectfully requested.

In view of the above Amendments and Remarks, allowance of all claims is respectfully requested. Applicant's attorney is available at the number listed below should any questions arise.

Respectfully submitted,

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Dated: September 28, 2003

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